

SEQUENCE LISTING

<110> McBride, Jere W.  
Walker, David H.

<120> P153 and P156 Antigens for the Immunodiagnosis of  
Canine and Human Ehrlichioses and Uses Thereof

<130> D6481

<141> 2003-11-04

<150> US 60/423,573  
<151> 2002-11-04

<160> 2

<210> 1  
<211> 831  
<212> PRT  
<213> *Ehrlichia canis*

<220>  
<223> immunoreactive surface protein p153

<400> 1

Pro Arg Gly Asp Val Ala Glu Leu Gln Glu Ala Val Glu Glu Asp  
5 10 15  
Pro Leu Tyr Ala Val Pro Leu Pro Lys Gly Gln Arg Pro Ala Pro  
20 25 30  
Thr Gln Val Leu Glu Glu Asp Pro Ser Val Glu Glu Glu Glu Glu  
35 40 45  
Ile Ala Pro Pro Leu Pro Pro Arg Asn Asn Val Gly Glu Val Glu  
50 55 60  
Pro Gln Glu Asp Pro Ile Tyr Gln Gly Ile Pro Gly His Gln Glu  
65 70 75  
Glu Met Glu Glu Asp Pro Tyr Ala Ser Leu Asp Gln Val Ser Gln  
80 85 90  
Gly Ala Gly Ala Asp Gly Ile Gln Glu Asn Pro Val Pro Gln Glu  
95 100 105  
Ala Gly Glu Glu Leu Glu Glu Asp Ile Tyr Gln Asp Pro Ala Asp  
110 115 120  
Phe Gln Gly Leu Gly Gln Gly Gln Gln Leu Asp Gln Ala Gly  
125 130 135  
Tyr Gln Gly Pro Ser Ile Gly Asp Arg Gln Leu Val Asn Gly Pro  
140 145 150  
Tyr Gly Phe Asn Asp Gly Ser Tyr Ala Met Glu Phe Asp Asp Val  
155 160 165  
Met Trp Glu Gly Val Arg Asp Ala Val Ile His Asp Glu Glu Ile  
170 175 180  
Asp Pro Lys Phe Leu Val Thr Asp Gly Leu Met Arg His Ile Cys  
185 190 195

Asp	Lys	Ile	Val	Gln	Ser	Glu	Gly	Asn	Leu	Pro	Glu	Pro	Asp	Leu
				200					205					210
Glu	Glu	Ile	Val	Ser	Ile	Leu	Lys	Asn	Asp	Lys	Glu	Gly	Ile	Ser
				215					220					225
Glu	Leu	Ile	Asn	Glu	Pro	Val	Gln	Val	Asp	Ile	Pro	Asn	Asn	Pro
				230					235					240
Val	Arg	Glu	Gly	Arg	Asn	Val	Met	Thr	Leu	Leu	His	Leu	Ala	Tyr
				245					250					255
Ala	Tyr	Asn	Val	Asp	Pro	Arg	Ile	Ile	Asn	Ala	Ile	Glu	Ser	Val
				260					265					270
Glu	Asn	Ser	Phe	Gly	Glu	Ser	Gly	Leu	Asp	Gly	Tyr	Asn	Ile	Gln
				275					280					285
Asp	Ala	Asp	Gly	Asn	Leu	Pro	Leu	His	His	Ala	Ala	Lys	Asn	Cys
				290					295					300
Asn	Gly	Gln	Val	Leu	Asp	Asn	Cys	Ile	Ser	Lys	Thr	Asn	Ser	Asn
				305					310					315
Ile	Ile	Asn	Ile	Arg	Asn	Phe	Gly	Asn	Gln	Ser	Pro	Leu	His	Val
				320					325					330
Met	Val	Gln	Asn	Pro	Gly	Cys	Ser	Ile	Gly	Asn	Ile	Gln	Val	Ala
				335					340					345
Asn	Glu	Cys	Gly	Met	Asp	Phe	Asn	Leu	Ile	Asp	His	Pro	Thr	Gly
				350					355					360
Arg	Met	Pro	Ile	His	Tyr	Ala	Ala	Glu	Ala	Ala	Ser	Ser	Glu	Val
				365					370					375
Leu	Ser	Tyr	Val	Ile	Arg	Asn	Thr	Lys	Ala	Glu	Ser	Pro	Gln	Ala
				380					385					390
Ser	Ala	Val	Asn	Thr	Gln	Asp	Val	Asn	Gly	Arg	Thr	Pro	Leu	His
				395					400					405
Cys	Ala	Ala	Ile	Ser	Gly	Asn	Ser	Lys	Gly	Leu	Ser	Val	Met	Leu
				410					415					420
Leu	Gln	Asn	Gly	Val	Asp	Cys	Ala	Val	Arg	Asp	Lys	Asn	Tyr	Ser
				425					430					435
Thr	Pro	Leu	His	Tyr	Ala	Val	Ala	Gly	Asn	Asp	Ile	Lys	Ser	Ile
				440					445					450
Lys	Asn	Leu	Cys	Ser	Val	Lys	Gly	Arg	Val	Gln	Gly	Val	Lys	Ser
				455					460					465
Ser	Ala	Ala	Ser	Leu	Leu	Cys	Glu	Asp	Leu	Gln	Gly	Asp	Thr	Pro
				470					475					480
Leu	His	Ile	Ala	Cys	Lys	Val	Glu	Gly	Thr	Lys	Ala	Phe	Glu	Thr
				485					490					495
Val	Arg	Gln	Ser	Ile	Lys	Lys	His	His	Gly	Lys	Gln	Val	Leu	Gln
				500					505					510
Glu	Leu	Leu	Ile	Arg	Glu	Gly	Ser	Gly	Pro	Arg	Leu	Asn	Val	Ser
				515					520					525
Gly	Phe	Gly	Ser	Gln	Ser	Ile	Leu	Ser	Gly	Val	Ser	Gly	Asp	Leu
				530					535					540
Tyr	Gly	Tyr	Leu	Asn	Ser	Gln	Asn	Phe	Pro	Thr	Ser	Pro	Val	His
				545					550					555
Ala	Ala	Val	Lys	Ala	Asn	Asn	Leu	Gln	Leu	Leu	Asn	Leu	Phe	Leu
				560					565					570
Lys	Lys	Ser	Pro	Asp	Ile	Leu	Arg	Gln	Ser	Ser	Pro	Asn	Gly	Phe
				575					580					585

Asn	Pro	Val	His	Met	Ala	Ala	Leu	Phe	Ala	Asp	Val	Lys	Thr	Val
				590					595					600
Lys	Leu	Ile	Ile	Glu	Asn	Ala	Ser	Gly	Glu	Glu	Val	Asn	Ala	Gln
				605					610					615
Ser	Asp	Ser	Thr	Leu	Thr	Pro	Leu	His	Leu	Ala	Cys	Ile	Arg	Gly
				620					625					630
Asp	Gly	Ser	Ile	Ile	Lys	Arg	Met	Val	Glu	His	Glu	Ser	Val	Asn
				635					640					645
Val	Asn	Gln	Thr	Met	Gly	Pro	Asp	Gln	Asn	Thr	Val	Leu	Gln	Tyr
				650					655					660
Ala	Ile	Asn	Arg	Gly	Asn	His	Ser	Leu	Ile	Lys	Arg	Leu	Leu	Ser
				665					670					675
His	Pro	Ser	Ile	Asp	Leu	Asn	Val	Arg	Asn	Ala	Asp	Gly	Lys	Thr
				680					685					690
Ser	Ala	His	Ser	Ala	Met	Glu	Lys	Gly	Asp	Leu	Lys	Thr	Val	Lys
				695					700					705
Ala	Leu	Cys	Asn	Ala	Gly	Ala	Asp	Val	Asn	Thr	Val	Asp	Asn	Asn
				710					715					720
Gly	Arg	Ser	Val	Ile	Ser	Ser	Ala	Ile	Tyr	Ser	Gly	Gln	Asn	Glu
				725					730					735
Lys	Lys	Leu	Val	Pro	Ile	Val	Lys	Leu	Leu	Leu	Asn	Ser	Gly	Ala
				740					745					750
Lys	Ile	Gly	Ser	Gln	Glu	Asp	Lys	Asn	Ile	Leu	Leu	Gln	Lys	Cys
				755					760					765
Ile	Asn	Ser	Gly	Tyr	Asn	Lys	Leu	Leu	Asp	Leu	Leu	Leu	Glu	Gln
				770					775					780
Gly	Glu	Arg	Ile	Asn	Val	Glu	Gly	Lys	Ala	Ser	Pro	Leu	Val	Ser
				785					790					795
Ala	Val	Val	Ser	Gly	Asn	Thr	His	Ala	Val	Lys	Lys	Leu	Val	Ala
				800					805					810
Ser	Gly	Gly	Asp	Ile	Asn	Gln	Lys	Val	Ser	Asp	Glu	Asn	Ser	Ile
				815					820					825
His	Tyr	Lys	Asn	Ser	Leu									
				830										

<210> 2  
 <211> 831  
 <212> PRT  
 <213> *Ehrlichia chaffeensis*

<220>  
 <223> immunoreactive surface protein p156

<400> 2

Pro	Ser	Gly	Asp	Ile	Gln	Asp	Gln	Ser	Gln	Gln	Asp	Gln	Gln	Glu
				5					10					15
Gln	Asp	Gln	Gln	Gln	Gly	Ala	Val	Gly	Gly	Ala	Val	Gly	Asn	Ser
				20					25					30
Pro	Ile	Glu	Arg	Glu	Arg	Val	Ala	Ala	Pro	Glu	Ser	Glu	Asp	Leu
				35					40					45
Tyr	Thr	Val	Ile	Ile	Pro	Lys	Gly	Lys	Arg	Thr	Ala	Ala	Pro	Ile
				50					55					60

Leu	Glu	Arg	Lys	Ser	Pro	Thr	Pro	Glu	Pro	Lys	Val	Glu	Asp	Asp
					65					70				75
Glu	Asp	Leu	Pro	Pro	Thr	Leu	Pro	Pro	Arg	Thr	Phe	Ser	Gly	Glu
					80					85				90
Gly	Tyr	Asp	Asp	Val	Gly	Val	Ser	Met	Pro	Thr	Val	Ser	Arg	Gly
					95					100				105
Ile	Tyr	Gln	Pro	Pro	Ile	Val	Gln	Asp	Ser	Asn	Leu	Tyr	Ser	Ser
					110					115				120
Ile	Gly	Gly	Val	Pro	Gln	Glu	Ala	Gln	Tyr	Asp	Ala	Ala	Ala	Arg
					125					130				135
Ala	Gly	Gly	Pro	Arg	Lys	Phe	Leu	Tyr	Gly	Pro	Tyr	Thr	Phe	Ser
					140					145				150
Asn	Gly	Gln	Glu	Ile	Met	Asp	Phe	Glu	Phe	Asp	Thr	Pro	Trp	Pro
					155					160				165
Asp	Val	Arg	Asn	Ala	Val	Leu	Gly	Asn	Lys	Glu	Ile	Lys	Glu	Glu
					170					175				180
Trp	Leu	Thr	Thr	Ser	Gly	Pro	Val	Arg	Asp	Ile	Ala	Asp	Arg	Ile
					185					190				195
Val	Ala	Ser	Lys	Gly	Asp	Leu	Ser	Glu	Asp	Gln	Val	Glu	Glu	Ile
					200					205				210
Leu	Asp	Ile	Ile	Phe	Met	Asn	Glu	Ser	Glu	Ile	Ala	Glu	Gly	Ile
					215					220				225
Ser	Asn	Pro	Leu	His	Ala	Asp	Val	Asp	Asn	Asn	Pro	Val	Lys	Gly
					230					235				240
Ala	Lys	Asn	Val	Met	Thr	Leu	Met	His	Leu	Val	Tyr	Ala	Cys	Asp
					245					250				255
Val	Asp	Pro	Arg	Ile	Val	Lys	Ala	Leu	Gly	Glu	Val	Glu	Asn	Asp
					260					265				270
Glu	Gly	Asp	Leu	Gly	Ala	Asn	Ala	Tyr	Asn	Val	Leu	Asp	Ser	Glu
					275					280				285
Gly	Asn	Leu	Pro	Leu	His	His	Ala	Ala	Lys	Asn	Cys	Thr	Gly	Asp
					290					295				300
Lys	Leu	Lys	Leu	Cys	Met	Glu	Lys	Thr	Lys	Thr	Asp	Phe	Ile	Asp
					305					310				315
Thr	Ala	Asn	Phe	Ala	Asn	Gln	Ser	Pro	Leu	His	Ile	Ile	Thr	Gln
					320					325				330
Lys	Pro	Asp	Cys	Ser	Val	Leu	Asp	Ile	Glu	Glu	Phe	Thr	Ser	Arg
					335					340				345
Asn	Leu	Asp	Phe	Gly	Leu	Val	Asp	Gly	Asp	Gly	Lys	Asn	Pro	Leu
					350					355				360
His	His	Ala	Val	Glu	His	Leu	Pro	Pro	Val	Ile	Leu	Lys	Gly	Val
					365					370				375
Met	Asp	His	Val	Lys	Asn	Ser	Ser	Glu	Phe	Gln	Asp	Leu	Val	Asn
					380					385				390
Asp	Pro	Asp	Tyr	Phe	Gly	Asn	Thr	Ile	Ala	His	Tyr	Ala	Val	Lys
					395					400				405
Asn	Lys	Asn	Ala	Asp	Leu	Thr	Leu	Phe	Asn	Met	Leu	Lys	Ala	Ser
					410					415				420
Gly	Ala	Asp	Leu	Asn	Val	Arg	Asn	Val	Val	Gly	Arg	Ala	Pro	Ile
					425					430				435
His	Val	Ala	Ser	Ser	Asn	Gly	Lys	Ala	Asn	Ala	Val	Ser	Gly	Leu
					440					445				450

Val Ser Cys Gly Ile Asp Val Asn Ser Gln Asp Val Asn Gly Asp  
                   455                  460                  465  
 Thr Pro Leu His Ile Ala Val Glu Gly Gly Ser Met Glu Thr Val  
                   470                  475                  480  
 Leu Ala Val Leu Asn Gln Arg Gly Ala Asp Val Ser Val Gln Asn  
                   485                  490                  495  
 Asn Asp Gly Val Thr Pro Met Leu Ser Ala Ala Lys Tyr Gly Asp  
                   500                  505                  510  
 Ile Gly Val Ile Lys Ala Leu Gly Ser Ala Lys Pro Asn Ile Lys  
                   515                  520                  525  
 Gly Glu Asp Thr Val Ala Lys Ser Leu Leu Met Glu Asp Tyr Lys  
                   530                  535                  540  
 Gly Phe Thr Pro Leu His Phe Val Ala Gly Gly Gly Ser Arg Asp  
                   545                  550                  555  
 Thr Phe Arg Val Val Arg Lys Asn Tyr Glu Lys Cys His Asp Leu  
                   560                  565                  570  
 Ala Thr Ile Arg Ala Ala Leu Met Gln Asp Arg Ser Gly Gly Glu  
                   575                  580                  585  
 Leu Val Asn Leu Gly Asp Phe Glu Ser Glu Asn Ile Leu Gly Ser  
                   590                  595                  600  
 Pro Asn Ala Lys Phe Leu Gln His Ile Gln Ser Ala Asn Phe Gly  
                   605                  610                  615  
 Phe Ser Pro Ala Arg Arg Gly Ile Val Ser Ser Asn His Asn Val  
                   620                  625                  630  
 Met Lys Asp Ile Leu Asn Phe Val Gly Asp Ser Leu His Leu Pro  
                   635                  640                  645  
 Ser Glu Arg Gly Tyr Asn Ala Met Gln Val Ala Ala Leu Phe Gly  
                   650                  655                  660  
 Asp Lys Glu Ala Val Lys Met Leu Ala Lys Ser Ala Lys Pro Ser  
                   665                  670                  675  
 Asp Leu Asn Phe Lys Thr Ser Ala Thr Pro Thr Pro Leu Asn Leu  
                   680                  685                  690  
 Ala Cys Leu Arg Gly Asp Asn Glu Val Val Arg Gly Leu Val Gly  
                   695                  700                  705  
 Gln His Gly Ile Asp Ile Asn Gln Arg Met Gly Ser Asp Lys Asn  
                   710                  715                  720  
 Thr Val Leu His Tyr Ala Ile Ser Lys Gly Asp Ser Phe Leu Val  
                   725                  730                  735  
 Gln Lys Ile Leu Ala His Thr Gly Val Asp Val Asn Cys Glu Asn  
                   740                  745                  750  
 Asn Leu Gly Gln Thr Pro Leu His Leu Ala Val Glu Gly Gly Asp  
                   755                  760                  765  
 Pro Lys Ile Val Ser Ser Leu Leu Lys Ala Gly Ala Val Val Asn  
                   770                  775                  780  
 Arg Leu Asp Asp Asn Gly Arg Ser Val Leu Ser Ser Ala Ile Val  
                   785                  790                  795  
 Pro Gly Arg Lys Glu Lys Gly Val Leu Gly Ile Val Asn Lys Leu  
                   800                  805                  810  
 Leu Asp Arg Gly Ala Asp Ile Asn Leu Asp Gly Asp His Asn Ile  
                   815                  820                  825  
 Leu Phe Asp Gln Cys Leu  
                   830